

(12) **UK Patent Application** (19) **GB** (11) **2 321 668** (13) **A**

(43) Date of A Publication 05.08.1998

(21) Application No 9724626.8

(22) Date of Filing 20.11.1997

(30) Priority Data

(31) 29701470 (32) 29.01.1997 (33) DE

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(51) INT CL⁶

E05D 7/10 1/06 11/06

(52) UK CL (Edition P)

E2F FAH FPD

(56) Documents Cited

GB 2290828 A GB 2235682 A GB 2136624 A
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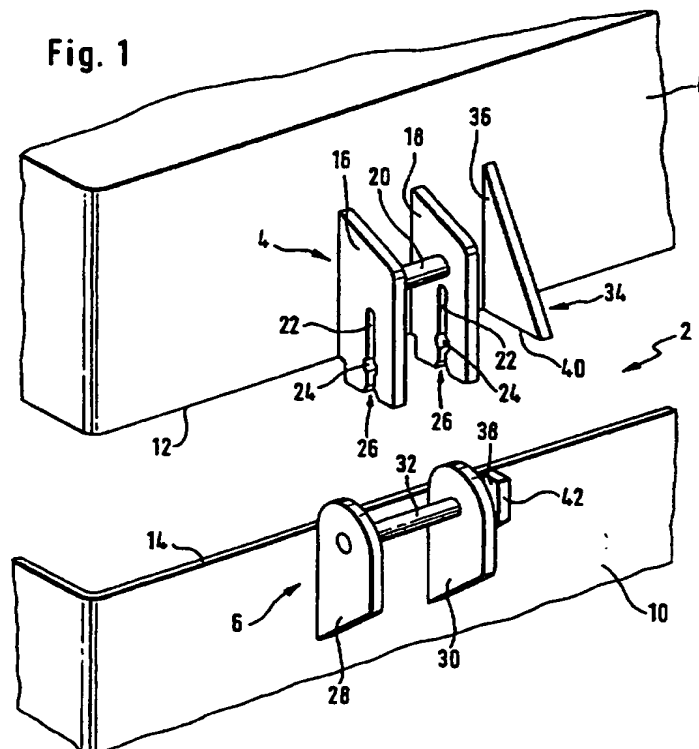
(58) Field of Search

UK CL (Edition P) E2F FAH FPD
INT CL⁶ E05D 1/06 7/10 11/06
Online: WPI

(54) Abstract Title

Releasable hinge device

(57) A hinge device for pivotally connecting two components (8, 10) comprises a first hinge part (4) on one of the components and a second hinge part (6) on the other component, the hinge parts being disengageable from one another through application of a force and wherein limiting means (34, 38) is arranged in the vicinity of the hinge on the two components (8, 10) and causes release of the first hinge part (4) from the second hinge part (6) when the pivoting motion between the two components (8, 10) exceeds a predetermined amount.



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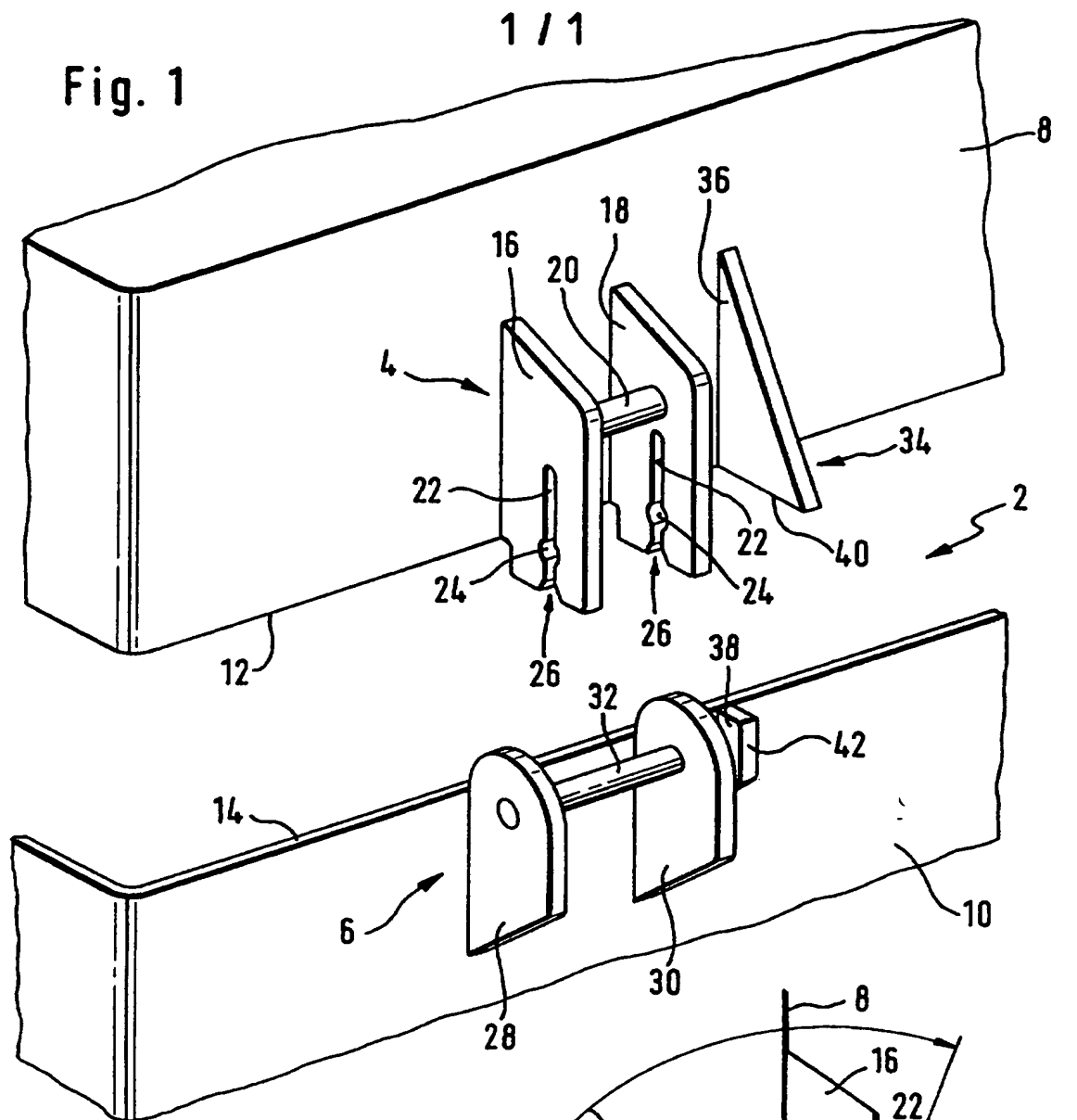
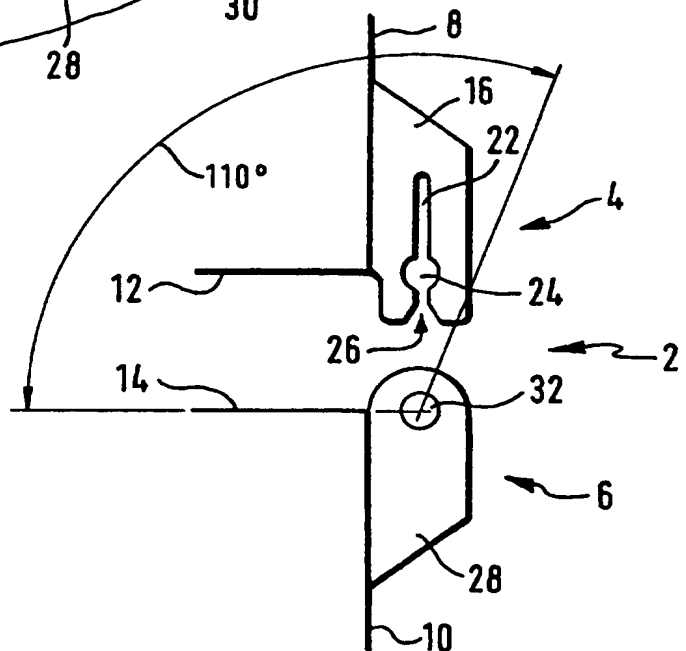


Fig. 2



Hinge device

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The invention concerns a hinge device in accordance with the preamble of claim 1.

Hinge devices of the type in question are known. Such
10 hinge devices serve for pivotal connection of two components, e.g. of a chest- or box-shaped container with a matching lid. Examples for the application of such containers are e.g. storage boxes for index cards, diskettes or the like. The hinge device consists of a first hinge part
15 on the lid and a second hinge part on the container. The two hinge parts are in mutual pivotal engagement and can, as a rule, be assembled or disassembled by application of a force, whereby it is first of all possible to combine the two hinge parts during production of the container unit
20 including a lid, and later on to remove the lid from the container in a given case.

As a rule, first hinge part and lid and second hinge part and container are respectively produced to be integral,
25 gral, particularly of plastic material.

It is often felt to be a drawback of these known hinge devices that the lid can be kept in its open position merely by the rear edge of the lid being stopped at the
30 rear edge of the container. Depending on height or dimensions of lid and container, the opening angle may thus reach an amount at which the container becomes unbalanced and tips over backwards.

35 Separating the two hinge parts for the purpose of removing the lid from the container according to necessity furthermore often involves the use of high forces. Since

the forces to be applied moreover act comparatively randomly on the hinge device, the act of separating the two hinge parts from each other may result in damage to one or both of the two hinge parts.

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It is therefore an object of the present invention to develop a hinge device according to the preamble of claim 1 in such a way as to avoid the named drawbacks.

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The present invention thus proposes to arrange, in the vicinity of the hinge device on the two components, e.g. on the lid and on the container, a limiting means which limits the pivoting motion upon reaching a specific angular position of first and second components, and which releases the engagement between first and second hinge parts when this angular position is exceeded.

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First of all, this creates the possibility of defining the degree to which the first component can be opened relative to the second component, e.g. of the lid relative to the container, by limiting the pivoting motion between lid and container in such a way that the balance of the container cannot become unstable even with a fully opened lid, which would otherwise result in the container tipping over. Where furthermore the first component, i.e. the lid in the case of a lidded container, is purposely moved beyond this angular position defined by the limiting means, the engagement between first and second hinge parts is released by the limiting means. The separation of first and second hinge parts thus ensues as the result of a defined movement with a clearly defined application of force, such that damage to either one of first and second hinge parts upon separation is impossible if these two parts are correspondingly designed.

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Advantageous developments of the invention constitute the subject matters of the subclaims.

The limiting means preferably comprises a nose-shaped stop projection on the first or second component, which is stopped at the second or first component when the specific angular position is reached. This makes for a limiting means with a simple construction yet safe design, wherein the stop projection may readily be jointly formed to be integral with the respective component if the first or second component is produced by an injection molding process etc.

In accordance with a preferred embodiment, the stop projection may furthermore be stopped at the first or second component by a corresponding stop shoulder on the second or first component. By a suitable design of this stop shoulder the relative angular position of the two components can be adjusted within a wide range. In a process of separating first and second hinge parts the stop shoulder moreover prevents a deformation of the component on which the stop projection is supported.

The first hinge part may comprise at least one tongue-shaped mounting plate provided with a slit which can be brought into positive/frictional engagement with a matching part in the second hinge part. Although such a design of the two hinge parts is known per se, it nevertheless constitutes a useful and advantageous embodiment of the present invention.

It is furthermore preferred for the first hinge part to comprise two parallel mounting plates each of which is provided with a slit, and for the second hinge part to comprise a pin extending between two mounting plates, which pin may be brought into positive/frictional engagement with the two slits. This embodiment of the two hinge parts is also known per se. It does, however, also constitute a useful and advantageous embodiment of the present invention

as the two parallel, slitted mounting plates, which jointly encompass the pin in the associated hinge part with positive/frictional engagement, enable a relative movement of the two components which is functionally safe and free of tilting.

In accordance with a preferred embodiment, the angle of the two components can amount to approximately 110° in the mentioned specific angular position. By such an amount of opening it is, on the one hand, ensured that e.g. when the present invention is applied to a lidded container, the lid in its opened state provides full access to the open top side of the container without, however, being tilted backwards to a degree where the container, which may be empty, would become unbalanced.

Further details, aspects and advantages of the present invention can be taken from the following description of an embodiment by reference to the drawing, wherein:

Fig. 1 is a perspective view of an embodiment of the present invention in the disassembled state; and

Fig. 2 is a side elevation of the hinge device according to the invention.

The two figures of the drawing each show a hinge device 2 consisting of a first hinge part 4 and a second hinge part 6. The first hinge part 4 is associated with a first component 8, and the second hinge part 6 is associated with a second component 10. In an exemplary embodiment the second component 10 may be a chest- or box-like storage container, while the first component 8 is a matching lid.

Hinge part 4 is arranged in the area of the lower edge 12 of the first component 8, and hinge part 6 is arranged in the area of the upper free edge of the second component

10. The arrangement of hinge parts 4 and 6 is such that the hinge parts 4 and 6 are in a substantially aligned configuration if components 8 and 10 are placed on one another. In general, two or more hinge parts 4 and 6 are arranged in the area of the edges 12 and 14 in the longitudinal direction of the respective edge.

Hinge part 4 consists of two parallel mounting plates 16 and 18 which are furthermore interconnected through a stiffening element 20, and the lower free edges of which project beyond the plane of the lower edge 12 of component 8. Each one of the mounting plates 16 and 18 has a longitudinal, or vertical, slit 22 opening in a downward direction. Each slit 22 has a substantially circular widened portion 24. The slit 22 opens at the lower end region of each one of mounting plates 16 and 18 in a reversed V-shape to thereby form an insertion opening 26.

The second hinge part 6 also comprises two parallel mounting plates 28 and 30, with mounting plates 28 and 30 projecting beyond the plane of the upper edge 14 of component 10. A pin 32, substantially parallel with edge 14 of component 10, extends between the two mounting plates 28 and 30.

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In order to realise the actual hinge device 2, the two hinge parts 4 and 6 are brought into positive/frictional engagement with each other. To this end, the first component 8 is placed on the second component 10 such that the hinge parts 4 and 6 oppose each other and that the pin 32 comes to lie in the two insertion openings 26, after which the pin 32 is made to penetrate into the slits 22 by downward pressure concurrently resulting in elastic deformation of mounting plates 16 and 18, until it is seated in the widened portions 24 while being held by its outer circumference. By thus establishing engagement between all of the hinge parts 4 and 6 arranged along the edges 12 and 14, the

component 8 is pivotally mounted relative to component 10. If component 8 is a lid and component 10 is a storage container, the lid of the storage container may be opened and closed, with pin 32 of the second hinge part 6 rotating
5 in the widened portion 24 of the first hinge part 4.

A limiting means 34 is arranged in the vicinity of the hinge device. The limiting means 34 comprises a nose-shaped stop projection 36 in the vicinity of the first hinge part
10 4, as well as a stop shoulder 38 in the vicinity of the second hinge part 6. If the first component 8 is moved relative to the second component 10, i.e. if, for instance, component 8 having the form of a lid is pivoted upward, then a surface 40 located at the bottom of projection 36 in
15 Fig. 1 contacts a surface 42 of shoulder 38 which extends vertically and faces outwardly in Fig. 1. Depending on the horizontal dimension of shoulder 38, the pivoting motion of the first component 8 is thus limited with respect to the second component 10: a smaller amount of horizontal projec-
20 tion of the shoulder 38 enables a wider range of the pivoting motion, and with an increasing amount of horizontal projection of the shoulder 38, mutual contact of surfaces 40 and 42 occurs at an earlier point, i.e. the pivoting motion is terminated at a correspondingly earlier point.

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In a preferred manner the shoulder 38 is dimensioned such that the lower edge 12 of the first component 8 can assume an angle of approximately 110° relative to the upper edge 14 of the second component 10, as is shown in Fig. 2.
30 If the lower component 10 has a horizontal orientation, the maximum pivoting angle of 110° ensures that the opened component 8 safely remains in this opened position. Furthermore it is ensured that the first component 8 cannot be pivoted excessively beyond the second component 10 and that
35 the second component 10 cannot tip over due to a resulting imbalance.

If the first hinge part 4 is to be removed from the second hinge part 6, the first component 8 is pivoted away from the second component 10 until the two surfaces 40 and 42 contact each other. Subsequently the first component 8
5 is pivoted a further distance by applying a certain amount of force until the pin 32 is eventually levered from the widened portions 24, or from the slits 22, respectively. The comparatively large area of contact between surfaces 40 and 42 prevents deformation in the area of rims 12 and 14,
10 and due to the defined levering motion there is no risk of e.g. the pin 32 and/or the mounting plates 16 and 18 being deformed or destroyed.

It will of course be understood that the hinged device according to the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.

It should also be understood that in the appended claims, reference numerals have been included merely to assist in an understanding of the claims and they are not intended to import any limitation into the claims.

Claims

1. Hinge device for pivotally connecting two components (8, 10), which comprises a first hinge part (4) on the first component (8) and a second hinge part (6) on the second component (10), wherein first (4) and second (6) hinge parts are in pivotal engagement with each other such as to be disengageable through application of a force, characterised in that a limiting means (34) arranged in the vicinity of the hinge device (2) on the two components (8, 10) limits the pivoting motion upon reaching a specific angular position of first (8) and second (10) components, and releases the engagement between first (4) and second (6) hinge parts when this angular position is exceeded.
2. Hinge device according to claim 1, characterised in that said limiting means (34) comprises a nose-shaped stop projection (36) on said first (second) component which is stopped at said second (first) component upon reaching said specific angular position.
3. Hinge device according to claim 2, characterised in that said stop projection (36) on said first (second) component is stopped at a corresponding stop shoulder (38) on said second (first) component.
4. Hinge device according to any one of the preceding claims, characterised in that said first hinge part (4) comprises at least one tongue-shaped mounting plate (16, 18) provided with a slit (22) which can be brought into positive/frictional engagement with a counterpart in said second hinge part (6).
5. Hinge device according to claim 4, characterised in that said first hinge part (4) comprises two parallel mounting plates (16, 18) each of which is provided with

a slit (22), and that said second hinge part (6) comprises a pin (32) which extends between two mounting plates (28, 30) and can be brought into positive/frictional engagement with said two slits (22).

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6. Hinge device according to any one of the preceding claims, characterised in that the angle formed by said two components (8, 10) in said specific angular position is approximately 110°.

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7. A hinge device for pivotally connecting two components (8,10), and substantially as hereinbefore described with reference to the accompanying drawings.



Application No: GB 9724626.8
Claims searched: 1-6

Examiner: Steven McIlroy
Date of search: 14 January 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): E2F (FAH, FPD)

Int Cl (Ed.6): E05D 1/06, 7/10, 11/06

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2290828 A (Application des Gaz) See esp. lines 6-22 in page 8 and stops 38, 39, 40 which limit movement of lid 6 relative to body 2 in figure 6.	1-3
X	GB 2235682 A (Dart Industries Inc) See line 4 in page 12 through to line 8 in page 13 and the sequence in figures 5, 6 and 7.	1-6
X	GB 2136624 A (Smart) See esp. line 83 in page 1 through to 15 in page 2 and the sequence in figures 2-5 (in reverse order).	1
X	GB 2047311 A (Bengtsson) See lines 16-72 in page 2 and the sequence in figures 5-7.	1
X	US 4372007 A (Lee) See lines 1-14 in column 3 and action of finger 17 in figure 5.	1, 2

X Document indicating lack of novelty or inventive step
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